SOUTHERN CALIFORNIA PARTICLE SUPERSITE

Progress Report for Period May 15-July 15, 2000

United States Environmental Protection Agency

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1. Introduction

The research activities of our Southern California Supersite are integral part of the overall themes of the Southern California Center for Ambient Particulate Matter (SCCAPM), a 5-year program that we were awarded through EPA's STAR initiative approximately one year ago

The overall objective of the Southern California Particle Supersite is to conduct research and monitoring that contributes to a better understanding of the measurement, sources, size distribution chemical composition and physical state, spatial and temporal variability and health effects of suspended particulate matter (PM) in the Los Angeles Basin (LAB). The specific research objectives are:

1. To characterize PM, its constituents and precursors, to better understand sources and transport affecting human exposure and to support development of State Implementation Plans (SIPs).
2. To obtain atmospheric measurements to support health studies designed to address causal factors, etiologic pathways and mechanisms of PM related morbidity and mortality with particular emphasis on PM source-receptor-exposure-effects pathways.
3. To conduct methods testing that will enable comparisons and evaluation of different technologies for characterizing PM including evaluation of new instrumentation, sampling methods and federal reference methods.

This report addresses the period between May 15 to August 15, 2000.

2. Particle Instrumentation Unit (PIU)

- PIU Trailer (20 foot) Infrastructure Modifications. Completed July 27, 2000: Installation and construction by UCLA's SEAS carpenters and machinists.
- Summary of Construction Modifications:
  A. Twelve Sample inlet ports have been installed through ceiling to outside. Figure 1 shows the inside front view of trailer, with R&P TEOM connected to ¾" Inlet Manifold. Figure 2 presents an outside view from the roof deck looking forward toward the front of trailer. Three pipe-to-tube (stainless steel) sample lines are secured through the roof using PVC bulkhead pipefittings. Photographs were taken prior to completion of construction, and without PM10 Size-Selective Cap attached to TEOM.

  B. Installation of adjustable leveling jacks
  C. Installation of all shelves and instrument racks
  D. New safety railing constructed (welded) and installed on the roof's platform.
  E. Safety rails constructed and welded onto existing roof ladder.
  F. R&P Partisol Dichotomous sampler secured onto platform, floor and wall inside trailer.

- Trailer Transport to First Monitoring Station (August 3, 2000): Trailer was transported from Warren Hall, UCLA, to Ranchos Los Amigos National Rehabilitation Center, in Downey, Los Angeles County.
- Summary of Operational Status and Progress of PIU Trailer:

  A. In general, all particle monitors are in operating condition, and most have been bench-tested to evaluate required start-up maintenance and to confirm reliability. During the week of July 24, 2000 some of the monitors were operated in a "Dry-Run" experiment, with the purpose of establishing initial instrument characterization, and inter-comparisons. Typical sampling results are given in appendix. Regular sampling not conducted at Warren Hall (UCLA) location due to ongoing construction by UCLA's SEAS carpenters/machinists. Data acquisition plan is pending a purchasing decision on the most appropriate multi-channel analog-digital and RS232 data-logger and computer. Met-One multi-channel data-logging system, or Keithley multi-port

board, requiring PCI-slot connection to a computer, are to be ordered shortly. Table 1, below, summarizes the status and progress for individual instruments.

Table 1. PIU Instrumentation Progress (Set-up, Check-out, and Characterization)

Continuous Monitoring Instruments

	INSTRUMENT (Model)	PROGRESS
1 **2**	**SMPS (Model 3934, TSI Inc.); APS (Model 3310, TSI Inc.)**	Designed new combined inlet for SMPS and APS. SMPS is connected by horizontal conductive inlet tubing to T-fitting that couples its inlet (0.3 L-min^{-1}) to the vertical inlet of the APS (5 L-min^{-1}), resulting in total sample flow-rate of 5.3 L-min^{-1}. Purpose is to minimize potential diffusion-losses of ultrafine particles that would have occurred if sampled directly through the original 2 meter long sample tube operating at 0.3 L-min^{-1}. Commenced development of software program for automatic merging of SMPS and APS data into one spreadsheet, and to generate size distributions into one curve (from 0.018 micrometer at the low end of the SMPS, and between 20 micrometer for the APS). A nebulizer system has been designed and constructed to generate standard mono-disperse calibration aerosols to be delivered to size distribution measuring instruments. TSP inlet (BGI, Inc.) for APS has been received and being set-up for testing inlet efficiency as a function of particle size.
3	**DataRAM, Mie Inc.**	Construction completed for an inlet denuder drier to prevent fogging of detector lenses during early morning (< 10:00 AM) and late day humid (>~ 4:30 PM) conditions, thus allowing continuous sampling. Periodic outdoor measurements made midday to test sampling through completed inlet; currently capable of downloading, via serial port, and logging of data to spread sheet and creating time-series plots.
4	**TEOM Model 1400, R&P, Inc.**	Set-up for sampling ambient air through completed inlet. Manifold connection through PM_{10} inlet completed, and ambient sampling tested. Currently, compares within 50 – 70% of DataRAM. Data recording limited to manual transcription of data from instrument's menu – capable of several weeks of continuously logged data.
5	**Wind Sensor, Met One Model 034A**	Received 10-meter Tower to comply with FRM measurement requirements. Data production and logging pending analog-digital connection. Tower to be free standing at Rancho site.
6	**Temp & RH Probe, Vaisala**	On shelf, not yet set-up, or tested, pending FRM sampling design

		requirements. Data production and logging pending analog-digital connection.
7	**CO Analyzer, Dasibi 1008**	On shelf. Common 2-inch inlet installed. Multi-port glass manifold not yet installed. Acquisition of multi-gas calibration system still pending. Data-acquisition pending calibrator and data-logging systems.
8	**O3, Dasibi Model 1003 AH**	On shelf. Common 2-inch inlet installed. Multi-port glass manifold not yet installed. Acquisition of multi-gas calibration system still pending. Data-acquisition pending calibrator and data-logging systems.
9	**NO_2 Chemiluminescence Monitor Labs 8840**	On shelf. Common 2-inch inlet installed. Multi-port glass manifold not yet installed. Acquisition of multi-gas calibration system still pending. Data-acquisition pending calibrator and data-logging systems.

Integrated size-segregated samples for chemical analysis (every 6th day)

	INSTRUMENT (Model)	PROGRESS
1	**MOUDI, MSP Corp., 2 Rotating versions**	Non-rotating MOUDI upgraded to rotating version for EC/OC sampling/analysis. 2nd rotating MOUDI for PAH and Elemental analysis. Bench testing limited, as lubricated-pumps were found to be inappropriate for Supersite. Operation pending the delivery of the upgraded version (arrived 7/15/00). 24-hour tests pending application of new 1/3-horse-power oil-less replacement pumps received July 28, 2000.
2	**One non-rotating MOUDI**	For mass and ion analysis. "Dry Run" comparison to Partisol Dichotomous (Coarse and PM2.5) Sampler limited to one 14-hour period (paired with Partisol), due to oil pump inadequacy. 24-hour tests pending application of new 1/3-horse-power oil-less replacement pumps (received July 28, 2000).
3	**Dual beam Aethalometer (Andersen)**	Tested to operate, have received manual recently, and consulted with vender and Harvard for special operating instruction. Not connected to ambient manifold until after planned trailer transport.
4	**Honeycomb Denuders**	On shelf, have not yet tested.
5	**Organic Denuder Sampler**	Purpose: to remove vapor phase VOCs' from sample stream, potentially removing organic confounders. Have confirmed connection to MOUDI inlet. Experiments scheduled for September to measure loss of volatile PAHs from particles, and to test whether this effects size-distribution.

24-hour Integrated Samples

	INSTRUMENT (Model)	PROGRESS
1	**Hi-Vol**	Prepared for transport to new site.
2	**PM10 and PM2.5 FRM Partisol**	Have operated frequently, but periodically due to trailer construction, have developed high level of confidence in instrument reliability. Paired "Dry-Run" experiments with Non-Rotating MOUDI conducted for 14 periods during week of July 17, 2000. Compared to MOUDI, slightly lower Coarse and PM2.5 filter-mass resulted.

B. Data handling Summary: The budget for acquisition of a data-logger and software has been approved. To date, manual data transfer processes have been used, except for the SMPS, APS, and DataRAM monitors.

C. General Procedures: Currently we are using paper forms to keep track of filters, substrates, and cartridges. These also serve as Chain of Custody forms. Coordinated forms have been established for three functional activities, weighing room, field (trailer), and analytical chemistry.

D. Items Required to Complete for to Conduct On-Site Routine Reportable-Data Operation:

1. August 3, 2000 – Trailer delivery date to first SCPCS Site. Ventilated sound controlling box for pumps to be constructed. Design is complete and parts have been received and fabrication is underway.
2. August 3 – 7, 2000 – Power connection planned at Hospital facilities.
3. August 8 – 22, 2000

- Characterization of SMPS & APS with standard PSL particles (0.03, 0.21, 0.67, 3.6 micron).
- Individual characterization of all operating equipment in bench test to test for reliability, to characterize instruments by inter-comparison measurements for those that measure the same qualities.

4. August 15 – 25, 2000 – Conduct dry runs of all instruments, to confirm power adequacy of trailer, and to debug trailer, as a unit.
5. August 28 – Plan on operating trailer as unit for acquiring reportable data.

E. **Summary of the Status and Progress of Additional Items:**

1. Nearly all instruments are operating.
2. Have begun to develop calibration procedures for all instruments.
3. Initial draft of Standard Operating Procedures (SOPs) is near completion for all instruments.
4. Hardware and software for data logging. One computer is dedicated to operating the continuous monitoring particle size distribution measuring instruments. It is operating with the necessary software, and installed hardware. Another computer, not yet ordered, will be equipped with boards for multiple RS-232 and analog inputs. It will serve a combine

function as a data logger and desktop computer for initial data acquisition, reduction, and adjustment. It will also serve to transmit data to the main data storage computer and to investigators, and be programmed for remote monitoring and control of continuous sampling equipment. Develop automatic calculation of size distribution parameters and respiratory deposition

5. Currently, we are using paper forms to keep track of filters, substrates, and cartridges. Coordinated forms have been established for three functional activities: weighing room, field (trailer), and analytical chemistry. These will be augmented with their electronic equivalents as we develop more automated procedures. The paper forms provide chain of custody for samples and will continue to be used for that purpose. A coding system for filters has been established. Another coding system has been established for sample analysis.

MOVING OF TRAILER & PREPARATIONS

- Desks, chairs, and a filing cabinet have been secured to floor and walls.
- All manifold components (pipes and tubes), will be disassembled and secured to roof-ladder, which in turn, will be place on trailer floor and secured to legs of left wall bench inside trailer.
- Roof rack will be disassembled and strapped to legs of benches and furniture in trailer.
- All particle and gas equipment will be delivered by car to site.
- Adjustable shelves to be removed from wall and strapped to secured items on floor.
- Pumps and tools will be stored and secured in tire well of trailer.
- Non-sensitive equipment will be secured to the counter of trailer itself.

3. Sampling in our First SCPCS Site (Rancho Los Amigos National Rehabilitation Medical Center)

Initial siting of the trailers at UCLA in the courtyard of Warren Hall was originally scheduled for a period of 90 days, starting on April 1, 2000. This period was for the installation of equipment, modification of trailers, calibration of equipment, and shakedown runs. It was anticipated that by late June, 2000, the PIU trailer will be moved to Rancho Los Amigos National Rehabilitation Center in south central Los Angeles, which will be our first site of our Southern California Particle Center and Supersite. Delays related to fabrication and outfitting of the PIU trailer forced us to postpone this move to Rancho Los Amigos the end of July 2000. Our anticipated installation day at Rancho is August 3rd, 2000.

We have already received approval for space allocation to our PM Center and Supersite activities at Rancho. We have finalized the site for placing our PIU and mobile concentrator trailers. The maintenance staff of Rancho Los Amigos has already installed the necessary power and water supplies that will be used to operate the trailers. The sampling site is within less than 1 km from a nearby freeway (710) and thus particularly attractive to conduct our inhalation studies to concentrated particulate matter.

The facility at Rancho Los Amigos National Rehabilitation Center in Downey is situated in the middle of the Los Angeles "Alameda corridor." Downey has some of the highest inhalable particle concentrations in the US often exceeding the National Ambient Air Quality Standard. The 20-mile long Alameda corridor is named after Alameda Street, joining the coastal area of Long Beach where a large number of industrial plants, oil distilleries, and the port of Los Angeles are currently operating to downtown Los Angeles It is a main transportation artery for heavy-duty Diesel trucks. Rancho Los Amigos is considered a "source" site relative to other SCPCS, such as Riverside or Rubidoux, which are considered "receptor" sites. This site is also downwind of major oil refineries and as such has exposure to metals as well as organics and other important chemical constituents. While being considered a "source" site preliminary data (described below) indicate considerable atmospheric chemistry with photochemical particle production occurs during summer seasons as indicated by size distribution variability of the chemical constituents.

We have already started part of our PM sampling at Rancho Los Amigos, in conjunction with ongoing human inhalation exposure studies to concentrated PM (these studies are part of our PM Center Toxicology core investigations). Our current sampling scheme involves 24-hour averaged, size-fractionated measurements of ambient and concentrated PM mass and chemical composition. Sampling is conducted approximately once per week.

During the period covering this progress report (May 15, 2000 to August 15, 2000), we have conducted 16 runs. In each run, consistent with our original Supersite proposal, we have used three

collocated Micro-Orifice Uniform Deposit Impactor (MOUDI) to group PM into the following size ranges:

- <0.1 μm (ultrafine particles)
- 0.15-0.35 μm (accumulation mode, "condensation" sub-mode)
- 0.35-1.0 μm (accumulation mode, "droplet" sub-mode)
- 1.0-2.5 μm ("intermediate" mode)
- 2.5-10 μm (coarse particles)

In addition to mass concentration, the following components have been measured for these size groups:

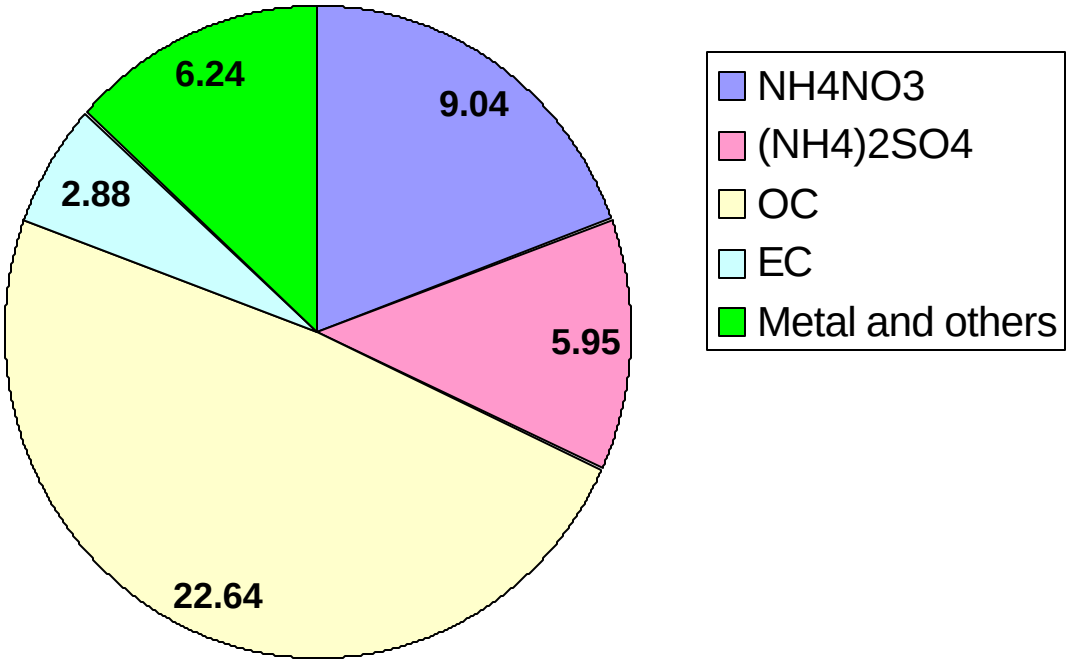
a. inorganic ions (i.e., sulfate, nitrate, ammonium)
b. trace elements and metals
c. elemental and organic carbon (EC/OC) content
d. concentrations of polycyclic aromatic hydrocarbons (PAH)

Ambient data are averaged over 24 hours, whereas data corresponding to concentrated PM are only averaged over two hours, as this is the typical duration of the human exposure experiments, conducted simultaneously with PM sampling.

Results from these measurements are shown in Figures 1-3 (pages 9-11)

Figure 1 is a pie chart showing the average concentrations of different PM2.5 constituents at Rancho Los Amigos. It should be noted that the numbers in the chart are concentrations, NOT percentages. The average mass concentration of PM2.5 during the period covered by these report (which also represents a period during which intense photochemical reactions occur in the Los Angeles Basin) was 46.8 $\mu g/m^3$. Primary particles (i.e., elemental carbon and metals) account for 6% and 13% of the total PM2.5 mass. The predominant trace elements and metals in the fine

Figure 1. PM2.5 composition in Downey from May to August. Average mass concentration 46.8 mg/m^3



PM mode at Downey were found to be Fe, Cu, Zn, Ni, Al, Ba and Mg. The unusually high average concentration (6.1 µg/m^3) as well as percentage of trace element and metals in this location clearly indicate the impact of nearby power plants and industrial sources (about 10 miles upwind, in the area of Long Beach). Ammonium sulfate accounts for roughly 13% of PM2.5. We anticipate that this value represents a maximum sulfate contribution to the overall PM2.5 mass, due to the enhancement of photochemical reactions that form sulfate in this period. It should be noted that in the summer months, sulfate in the East coast region might account for as much as 50-65% of PM-2.5 mass.

Nitrate concentrations were on the average 9 µg/m3 and accounted for 19% of the total PM-2.5 mass. We anticipate that this nitrate concentration and percent values represent a minimum, due to the increased values of the dissociation constant of ammonium nitrate at high temperatures and low relative humidities (such as those measured in this period at Downey), forcing ammonium nitrate into the gas

phase. This hypothesis will be evaluated further by similar measurements performed in this location during cooler periods, such as the Fall of 2000, during which we will continue our measurements at Downey.

Organic carbon concentrations contributed 40-60% of the mass, with an average value of 49% (corresponding to 23.1 μg/m3). We also anticipate that this value represents a maximum due to increased photochemical reactions taking place at this time of the year.

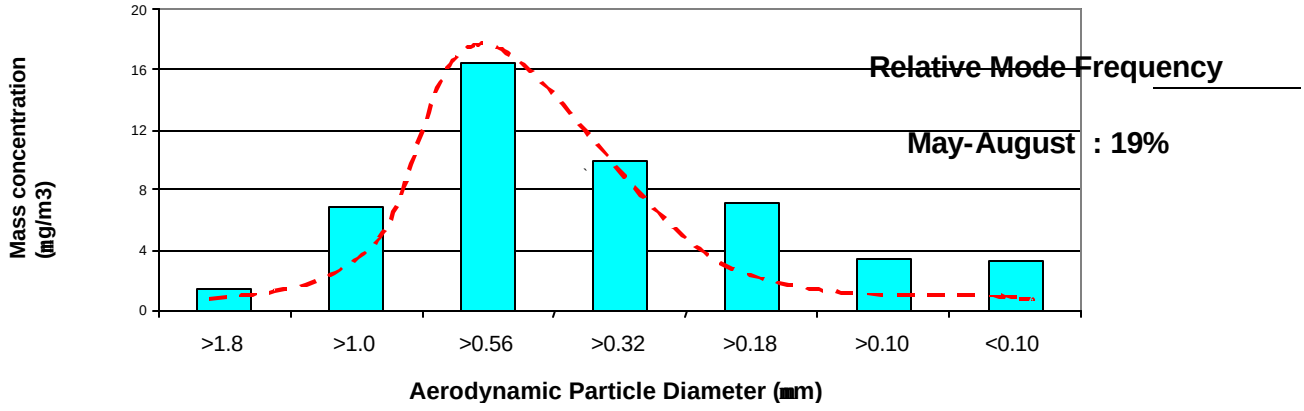
Figure 2 shows size distribution patterns of PM2.5 based on mass. It should be noted that the data shown do not represent average size distributions; instead they are representative profiles for the three most frequent size distribution patterns observed at Downey.

1. The first size distribution pattern represents a Unimodal distribution, with a peak in the droplet mode (0.35-1 um; produced by heterogeneous gas-to-particle conversions).
2. The second is a trimodal distribution, with distinct peaks in the ultrafine mode and the condensation mode (0.1-0.35 um; produced by homogeneous gas phase reactions). The data plotted in Figure 2 indicate that trimodal distribution is more common in the warmer months, when photochemical reactions produce a lot of secondary organics. This pattern accounted for 81% (13 of 16) size distributions measured.

The peak in the ultrafine mode has been observed in virtually all of our size distributions measurements during this period in this site, and is apparently related to the proximity of vehicular sources in this location. Such distinct peaks in the ultrafine mode are certainly not common in mass-based PM2.5 distributions and it would be of interest to determine whether this pattern will be observed in other locations of the Los Angeles Basin.

In general, whether the distribution is unimodal or trimodal depends on the prevailing mixing layer and meteorological conditions. Stagnation will cause ultrafine PM to grow to a larger size by agglomeration before they reach the sampling site at Rancho. Windier days will bring ultrafine PM to the site before they become agglomerated. These phenomena will be further investigated as part of our Supersite activities.

Figure 2. Unimodal PM-2.5 Size Distribution At Downey (Alameda Corridor), CA



Tri-modal PM-2.5 Size Distribution At Downey (Alameda Corridor), CA

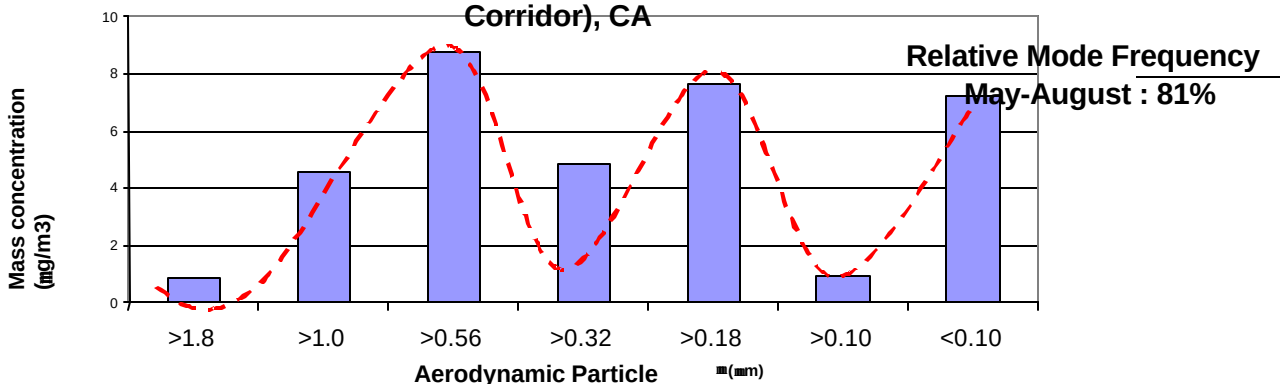
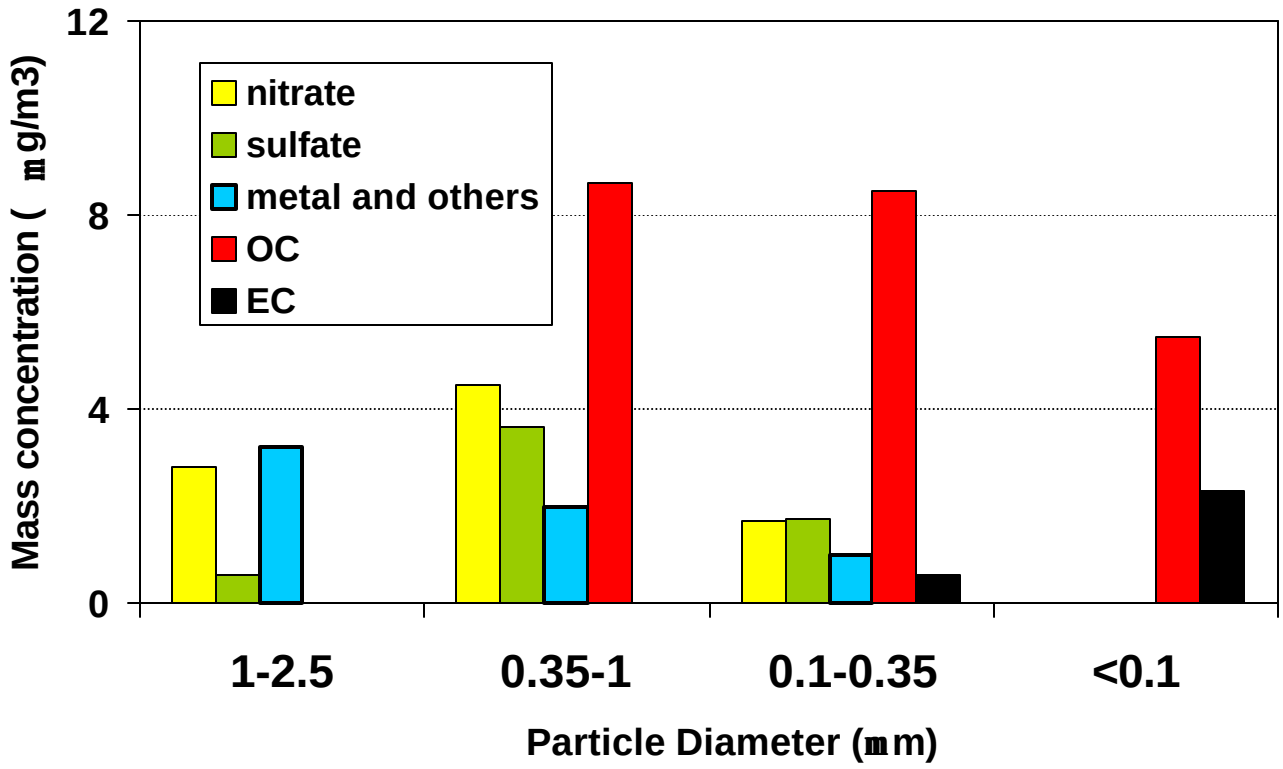


Figure 3 shows the average concentrations of different PM2.5 species, segregated by size. The mass fraction of each species has been classified into the ultrafine, condensation, droplet and intermediate modes. The data in Figure 3 show that particulate nitrate is almost exclusively partitioned in the droplet and intermediate modes, with over 50% of its mass being in the droplet mode. Only about 15% of nitrate is found in the condensation mode. Similarly, the majority of trace elements and metals are found in particles above 0.35 µm in size. However, unlike nitrate and sulfate, trace element and metal concentrations peak in the intermediate mode. This is undoubtedly due to the contribution of the "tail" of the coarse mode particles to the intermediate mode.

Figure 3. Size-dependent chemical composition of PM2.5 in Downey, CA. May-August 2000



Ultrafine PM constitute almost exclusively of elemental and organic carbon, with the OC content being roughly 2.5 times that of EC. Organic carbon is associated with particles in the droplet, condensation and ultrafine modes, with relative fractions of 37%, 37% and 26% in the 0.35-1, 0.1-0.35 and 0-0.1 μm size ranges, respectively. The predominant reactions that are responsible for the formation of organic particles would produce particles either in the ultarfine mode (expansion and cooling in the atmopshsre of freshly emitted condensable vapors) and the condensation mode (through homogeneous gas phase reactions forming low vapor pressure products). The peak observed during the warmer season in the droplet mode could be attributed to the following mechanism: because of the higher vapor pressure at high temperatures of some organics, volatile organic compounds (VOC) may volatilize from the surface of the smaller particles (in which they are originally found) and adsorb on the larger surface

area of the droplet mode particles. The validity of this hypothesis will be further investigated by field experiments during cooler seasons in this location.

Size Distribution Measurements of PAH

The purpose of this portion of the Supersite program is to measure detailed size-resolved PAH in all of the five proposed Los Angeles basin sites. The fate of semivolatile PAH in the atmosphere is largely dependent on their deposition, chemical reactions, and partitioning between the gas phase and sorption to the particulate phase. Because the sites are located near sources and downwind from major sources, they provide an opportunity to determine whether gas/particle partitioning occurs during transport across the Los Angeles Basin. Gas/particle partitioning would effectively alter the size distribution of the PAH and result in changes in their atmospheric transport and deposition in the human respiratory system. Major activities during the report period included the installation of a new Agilent HPLC system, evaluation of its performance, development of an analytical protocol to extract, separate and quantify priority polycyclic aromatic hydrocarbons (PAH) in particulate matter samples collected with a MOUDI impactor in Downey, CA, in March -May, 2000 (sample analysis was conducted after collection, and during the period covered by this report). The 15 PAH quantified include naphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-c,d]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene.

HPLC Method Performance. The analytical protocol developed quantified 15 of the 16 priority PAH with high precision (standard deviations under 2%). The instrument limit of detection (Table 1), defined at S/N ratio of 5, ranged from 0.01-0.9 ng/ml (ppb). This range is between one and two orders of magnitude lower than found for our GC-MS method. The HPLC-Fl system is thus more suited for the quantification of PAH in small volumes of samples collected with MOUDI impactors.

Table 1. PAH Codes and Detection Limits for the Agilent HPLC-FL system.

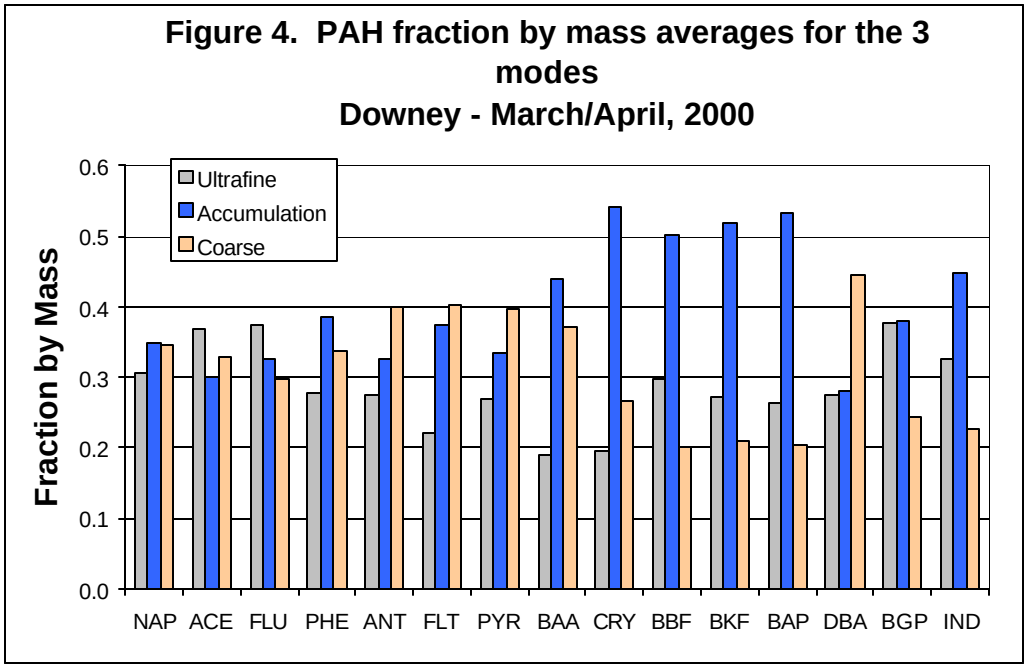
	PAH	Code	MW	# rings	Limit of Detection* ng/ml (ppb)
1	Naphthalene	NAP	128	2	0.03
2	Acenaphthene	ACE	154	3	0.01
3	Fluorene	FLU	166	3	0.06
4	Phenanthrene	PHE	178	3	0.04
5	Anthracene	ANT	178	3	0.01
6	Fluoranthene	FLT	202	4	0.06
7	Pyrene	PYR	202	4	0.02
8	benzo(a)anthracene	BAA	228	4	0.05
9	Chrysene	CRY	228	4	0.02
10	benzo(b)fluoranthene	BBF	252	5	0.05
11	benzo(k)fluoranthene	BKF	252	5	0.02
12	benzo(a)pyrene	BAP	252	5	0.04
13	indeno(1,2,3-cd)pyrene	IND	276	6	0.07
14	dibenz(a,h)anthracene	DBA	278	5	0.1
15	benzo(ghi)perylene	BGP	276	6	0.9

* at S/N = 5

Sample Extraction/Analysis. Briefly, the filters were ultrasonically extracted for 20 min with a 1:1 mixture of DCM:ACN (Fisher Optima grade). An aliquot of each extract was filtered, concentrated by evaporation (without drying!) to ~ 100 µL. Twenty µL aliquots were used for quantification. The HPLC system was calibrated using a NIST traceable PAH liquid standard (ERS-010 Radian).

Sample Collection. Sampling was carried out during four 24 hr periods between March – May , 2000, using a non-rotating MOUDI impactor, operating at 30 LPM (43. 3 m^3). The samples were collected onto Teflon filters in three size fractions, defined as ultrafine (0-0.18 µm), accumulation (0.18-2.5 µm), and coarse (2.5-10 µm).

PAH Concentration and Size Distribution. The average results for the aerosol concentration (sum of 3 modes) of the 15 PAH quantified in the three samples varied from 0.02 to 0.92 ng/m^3, and generally increased with MW (or number of rings). The average PAH fraction by mass for all samples (Figure 4) shows some interesting characteristics: For PAH with MW between 128 and 202 (NAP to PYR) the PAH mass is approximately equally distributed between the 3 modes. Beginning with BAA (MW 228), the accumulation mode predominates (except for DBA and BGP). The reasons for these exceptions are not known at this time, but it is worth noting that DBA concentrations are among the lowest, and BGP the highest found in the Downey aerosol.



For all 15 PAH quantified, the average fraction of PAH mass in each mode was, 0.29, 0.40, and 0.31, respectively, for the ultrafine, accumulation, and coarse mode. The average PAH mass fraction distribution found in the accumulation mode in the Downy samples (0.40) is very close to the value (0.42) found for MOUDI samples collected in Massachusetts during the summer (J. O. Allen et al., *Environ. Sci. Technol*., 30, 1023-1031, 1996.), but different for the ultrafine and coarse modes,

respectively 0.06 and 0.52 found for 6 of the 15 PAH quantified. Because seasonal variations are likely to play a role in the PAH size distribution, it is somewhat premature to try and compare the results of our study with those of Allen et al., (1996).

3. Data Management

The Data Management (DM) group of the SCPCS was formally launched in May 2000. Dr. RC Yu is overseeing the activities related to the data generation, storage and archiving of the data, statistical treatment of the data, and assistance in ready-for-publication data. The DM unit is working closely with NARSTO DM Working Group to develop a DM procedure for all SCPCS investigators. The procedure will be compatible with the general guideline that will be developed in NARSTO DM Working Group. Our goals are to ensure the data generated from the SCPCS will be defensible in terms of data collection, treatment, and publication.

Dr. Yu is actively participating in the NARSTO DM Working Group that holds a tele-conference call every week. During the past three months, the working group has completed a site naming convention. The SCPCS was designed LA Super site with a code 'ES2LUSCA' plus 4 additional characters representing the candidate SCPCS sites in the Los Angeles Basin: RVSD for Riverside, RBDX for Rubidoux, WSWD for Westwood (or UCLA), LNGB for Long Beach, DWNY for Downey, AZSA for Azusa, and LADT for downtown LA. In addition to the site-naming, the group is working on the issues of variable naming, size distribution data, flag and standard method, relational database, and amount and details of the data generated from continuing monitoring instruments (such as SPMS).

The SCPCS DM unit is still in its early stages. Two distinct types of data have been recognized: data from monitoring instruments and those from research activities. For the next four years, an estimate of 2.9 million data records will be generated. The DM group of the SCPCS is in the process of deciding (in consultation with DM groups of other Supersites) how to handle such large amount of data, what database software and systems should be used. Furthermore, these data will be properly linked with response data (or those will be generated in epidemiological and experimental studies). Currently, there is no consensus about how to define research data, from DM perspectives.

5. QA/QC Progress

During the previous quarter, efforts continued in the preparation of quality assurance (QA) documentation for the Southern California Supersite. A draft document should be available for comment by late Summer 2000. Towards that end, investigators who had been previously identified in the original application were contacted and asked to submit summary statements regarding their respective project's status.

In addition to collecting and preparing specific component sections of the QA document, at least two other significant events occurred regarding QA activities during the previous quarter. The first of these was the continuing participation of Southern California Supersite investigators in the monthly telephone discussions with other Supersite QA officers, led by the USEPA QA Officer, Mr. Dennis Mikel. These working group discussions have been valuable in sharing cross-site approaches that conform with the NARSTO protocol guidelines. The teleconferences have also served to coordinate uniform development of documentation among all sites and facilitate the timely dissemination of QA-related information.

The second important QA-related activity was the successful negotiation for an external QA Officer to perform the necessary oversight functions for the Supersite. Effective immediately, Mr. David Bush of Parsons Incorporated has been assigned responsibility for the overall QA associated with the operation of the Southern California Supersite. His previous experience in providing external QA oversight for several projects across the country makes him an ideal contractor to successfully fulfill this role. Although investigators within the Supersite (such as Ed Avol, Steve Colome, and Peter Jacques) will continue to work with Mr. Bush on QA matters, Mr. Bush will provide needed arms-length independent review of site operations.